

NEW SPECIES OF MALVACEAE FROM MEXICO AND BRAZIL

Paul A. Fryxell

Research Geneticist, U.S. Department of Agriculture, Agricultural Research Service, Texas A&M University, College Station, TX 77843

The ongoing activities of plant collectors continue to bring to light previously unrecognized and undescribed species, especially from tropical regions, and these discoveries continue to enlarge our understanding of the flora of these regions. Twelve new species in six genera of the Malvaceae are described below and are related to other members of their respective genera.

1. Abutilon pinkavae Fryxell, sp. nov.

Abutilon caulibus gracilibus erectis, saepe sine pilis stellatis; laminiis foliorum parvis (2-4 cm longis), concoloribus; corollis aurantiacis et stigmatibus marroninis; mericarpiis intus parce stellato-pubescentibus, apice spinescentibus (non tantummodo acuminatis), 2-spermis ut videtur.

Erect or spreading, branched subshrub, 0.5 m tall. Stems green when young becoming straw-colored, terete, slender, covered with multicellular (glandular) hairs 0.1-0.5 mm long, occasionally intermixed with simple hairs 1-2 mm long and rarely with a few stellate hairs, glabrate in age. Leaf blades commonly 2 cm long, 1.5 cm wide (rarely to 4.0 cm long, 3.5 cm wide), ovate-lanceolate, deeply cordate, weakly crenate or serrate, acute or obtuse, with a callus-thickening at apex more or less developed on under side, stellate-pubescent above and below, concolorous or very slightly discolorous, palmately 5-7 nerved. Petioles from slightly shorter than to much longer than the lamina, with pubescence like that of stem but with stellate hairs common especially at apex, sometimes red-pigmented except green at apex. Stipules linear, 3-4 mm long, 1 mm wide, pubescent, caducous, the scars often raised. Peduncles solitary in the axils, 1-4 cm long, usually exceeding the subtending petiole, articulated 3-5 mm below the calyx, with pubescence like that of stem except the long simple hairs more abundant. Calyx 8-17 mm long, 20-veined at the base, invested with stellate hairs, long simple hairs, and some multicellular hairs, 5-lobed, ca. 2/3-divided; lobes cordate and somewhat plicate at the base, approximately equaling the fruit. Petals 14-18 mm long, 10-14 mm broad, orange, glabrous except on margin of claw where white-stellate-pubescent. Staminal column 3 mm long, glabrous, orange, 10-nerved, antheriferous at summit; filaments 1.0-1.5 mm long, orange; anthers and pollen yellow. Styles 7, glabrous, yellow, exceeding androecium; stigmas capitate, 0.4 mm diameter, maroon. Fruit a schizocarp of 7 mericarps, the septicial dehiscence imperfect, the loculicidal dehiscence complete to the base; mericarps

(8-) 10-11(-15) mm long (including the apical spines), externally with both stellate hairs and long (1-2 mm) simple hairs, internally with a few stellate hairs near the base; each half-mericarp (after dehiscence at maturity) with a prominent costa along dorsal margin that at apex joins a comparable costa from ventral margin to form the apical spine 1-4 mm long. Seeds blackish, reniform, 2.1 mm long, 1.9 mm wide, muriculate, apparently 2 per mericarp.

Type: Mexico: Coahuila: Cuatro Ciénegas Basin, route 30 at north end of Sierra San Marcos, on roadside, 14 Aug 1975, Pinkava & Reeves 13044 (holotype: ASU; isotypes: pf and to be distributed by ASU).

Paratypes: Cuatro Ciénegas Basin, 1.8 mi SSW of Poso de la Becerra opposite Laguna Grande, 9 June 1968, Pinkava, Lehto, & Keil 5193 (ASU); Bajada, NW of Poso de Anteojo, in desert, 12 Jun 1968, Pinkava, Lehto, & Keil 5481 (ASU); Mt. Anteojo, 17 Jun 1968, Pinkava, Lehto, & Keil 5745 (ASU). Western Coahuila, Sierra de San Antonio, canyon at San Antonio de los Alamos, 2-3 Sep 1940, Johnston & Muller 885 (TEX).

The new species, which is illustrated in Fig. 1 and Fig. 13, A-B, is named in honor of Donald J. Pinkava, collector of the type material. It is clearly allied to Abutilon wrightii A. Gray and A. hypoleucum A. Gray, but it is distinct from both in several characters. Standley (1923), Kearney (1955), and Correll & Johnston (1970) differentiate A. wrightii and A. hypoleucum by the presence or absence, respectively, of long simple hairs on the stems, but this character is an imperfect basis for the distinction. Because he relied on this single character, Kearney erred (loc. cit., p. 253, note 32) in treating A. selerianum Ulbrich as a synonym of A. wrightii; it is in fact a synonym of A. hypoleucum. The characters presented in Table 1 clarify the differences between these two species and indicate the distinctiveness of A. pinkavae.

Abutilon pinkavae is known only from Coahuila. A. wrightii occurs from the Edwards Plateau of Texas south to Coahuila, Nuevo Leon, and Tamaulipas and west to Sonora. A. hypoleucum occurs from the Rio Grande Valley of South Texas, south through Coahuila, Nuevo León, Tamaulipas, and San Luis Potosí to Veracruz. I have seen one specimen of A. hypoleucum from Oaxaca (S. R. Hill 1774), but it is from northernmost Oaxaca on the Veracruz border near Tuxtepec, in the lowlands bordering the Gulf of Mexico. A. wrightii and A. hypoleucum are fully sympatric in many parts of northern Mexico, but my observations show no evidence of intergradation. I do not know whether A. pinkavae is sympatric with the other two species.

Chromosome counts of $n = 7$ have been reported for both A. wrightii (Krapovickas, 1967; Bates, 1976) and A. hypoleucum (Bates & Blanchard, 1970; Bates, 1976), but no count is yet known for A. pinkavae.

Table 1. Comparison of selected characters of three species of Abutilon.

	<u>A. pinkavae</u>	<u>A. wrightii</u>	<u>A. hypolecum</u>
growth habit	erect, to 0.5 m	procumbent or ascending	erect, to 1.5 m
stem diameter	up to 2 mm	up to 2 mm	<2 mm
stem pubescence	with few or no stellate hairs	including stellate hairs	including stellate hairs
leaf length	2-4 cm	2-4 cm	up to 12 cm
leaf margin	obscurely dentate	prominently dentate	dentate
leaf color	nearly concolorous	markedly discolorous	markedly discolorous
leaf pubescence (on under surface of mature leaf)	scattered stellate hairs	matted (white) stellate	matted (white) stellate
leaf apex	with small callus growth	lacking callus	lacking callus
calyx length	subequal to fruit	exceeding fruit	subequal to or exceeding fruit
petal size	14-18 mm	14-18 mm	20-25 mm
petal color	orange	pale yellow	yellow

(Continued)

Table 1. Comparison of selected characters of three species of Abutilon. (Continued)

	<i>A. pinkavae</i>	<i>A. wrightii</i>	<i>A. hypolecum</i>
no. of stigmas or carpels	7	6-9	13-15
mericarp apex	spinescent	acuminate	acuminate
dorsal line of dehiscence of mericarp	costate	ecostate	costate (but costae masked by pubescence)
inner carpel wall	sparsely stellate-pubescent basally	glabrous	glabrous
no. seed per carpel	2 (probably)	3	3
seed length	2.1 mm	2.6 mm	2.1 mm
seed surface	muriculate	muriculate	smooth

2. Dendrosida breedlovei Fryxell, sp. nov.

Dendrosida foliis straminei-puberulis, stipulis brevis (1.0-1.5 mm), calycibus parvis (10-12 mm longis).

Shrub or tree to 7 m tall. Twigs yellowish puberulent, becoming glabrate, the hairs stellate, ca. 0.2 mm long. Leaf lamina to 5 cm long, 3 cm broad, truncate or slightly cuneate at base, ovate or (rarely) weakly 3-lobed, the margin undulate-crenate or -serrate, rounded acute apically, palmately 5-7 nerved, minutely stellate-puberulent below, glabrate above but retaining hairs on main veins, somewhat discoloured, the veins prominently raised below, yellowish. Petioles up to 12 mm long, yellowish-puberulent. Stipules 1.0-1.5 mm long, deciduous, inconspicuous. Pedicels 4-10 mm long, axillary but crowded at branch tips. Calyces 10-12 mm long, 1 cm broad (in fruit), 10-ribbed from the base, the commissural ribs more prominent than the midribs of the lobes, minutely yellowish puberulent; lobes 3.5-5.0 mm broad, 3-nerved, the lateral nerves submarginal. Petals yellow, 15 mm long, densely ciliate-margined on claw but otherwise glabrous. Staminal column 4 mm long, pallid, stellate-pubescent, 5-nerved; filaments arising from apex of staminal column, 2-3 mm long; pollen yellow-orange. Styles ca. 8-9, pallid, slightly exceeding the stamens. Fruit a schizocarp of ca. 8-9 mericarps; mericarps 5.5 mm tall, 3.5 mm wide, sparsely stellate-pubescent on apex but otherwise glabrous, the lower portion 1-seeded, indehiscent, dorsally smooth but medially furrowed, laterally slightly reticulate at base, the upper portion dehiscent, divergent, acute.

Type: Mexico: Chiapas: Municipio de Cintalapa de Figueroa, 5 km west of Rizo de Oro along Mexican Highway 190, steep slope along ravines with Tropical Deciduous Forest, Zanthoxylum, Phyllanthus, Agonandra, and Guazuma; elevation 820 m, 18 Apr 1972, Breedlove 24629 (holotype: DS, isotype: pf); same citation, Breedlove 24644 (paratypes: DS, pf).

The new species, which is illustrated in Fig. 2, is named in honor of Dennis E. Breedlove, collector of the type material and knowledgeable authority on the flora of Chiapas, whence the new species comes. Indeed, the genus Dendrosida as a whole is known principally from the state of Chiapas, except for D. sharpiana (Miranda) Fryxell subsp. occidentalis Fryxell, which occurs in the state of Guerrero (cf. Fryxell, 1971), and a specimen of D. sharpiana recently examined (Carlson 2209) from Cerro Guiengola, Oaxaca. The three species now comprised in the genus are compared in Table 2. The measurement of carpel length (14-15 mm) given in the key to species (Fryxell, 1971) is taken from the original description of Sida sharpiana Miranda and is in error. Table 2 gives the correct length.

Table 2. Comparison of selected characters of the species of Dendrosida.

	<i>D. batesii</i>	<i>D. sharpiana</i>	<i>D. breedlovei</i>
Leaf form	deeply cordate, 3-lobed, to 18 cm long	truncate, simple, to 15 cm long	truncate, usually to 5 cm long
Foliar pubescence	glabrate	glabrate	minutely yellowish-puberulent
Petiole length	to 14 cm	to 6 cm	to 1.2 cm
Stipule length	4 mm	6-13 mm	1.0-1.5 mm
Calyx length	14-16 mm	15-20 mm	10-12 mm
Petal length	--	20-40 mm	15 mm
Mericaip length	5-8 mm	8-9 mm	5.5 mm

3. Hampea breedlovei Fryxell, sp. nov.

Hampea pedicellis longis (usque ad 11 cm) et gracilibus; fructibus amplis (3 cm diametro), pendulis, intus perfecte glabris; seminibus 2-3 in quoque loculo.

Tree 7 m tall in montane rain forest. Young branch tips minutely brown-puberulent soon becoming glabrate, green, minutely nigro-punctate. Leaf lamina entire, broadly elliptic, up to 25 cm long, 10 cm broad, palmately 3-nerved (or 5-nerved and the outermost pair submarginal), glabrate, minutely nigro-punctate; foliar nectary single on midrib, inconspicuous, 1-2 mm long, slit-like, 1-3 cm from base of lamina. Petioles up to 13.5 cm long (1/4-1/2 length of lamina), glabrate, punctate. Stipules 2-5 mm long, subulate, minutely brown-puberulent, caducous. Pedicels axillary, solitary, 3 cm long (in flower) to 11 cm long (in fruit), slender (1.0-1.5 mm diameter), glabrate, punctate. Bractlets of the involucre 3, brown-puberulent, subulate, 1.5-2.0 mm long, appressed to calyx, persistent but inconspicuous. Calyx 8 mm long, minutely puberulent proximally, glabrate and densely nigro-punctate distally except for five marginal tufts of brown hairs that are vestigial calyx lobes, otherwise truncate, becoming torn with the expansion of the flower. Petals (in bud) pallid, densely yellowish lepidote externally. Flowers otherwise unknown. Fruit pendulous, subspherical, 3 cm long, ligneous, 3-celled, greenish, glabrous within. Seeds 2 or 3 per locule, arillate, glabrous and shiny, ca. 1 cm long, almost black; aril presumably white (drying tan), surrounding half of seed.

Type: Mexico: Chiapas: Municipio of Rayón: in the selva negra 10 km above Rayón Mezcalapa along road to Jitotol; tree 20 ft tall on steep slope with dense montane rain forest (Magnolia, Podocarpus, Calatola, and Ardisia); elev. 1700 m; 27 Jan 1973, Breedlove & Smith 32601 (holotype: DS-652778).

This species is named in honor of Dennis E. Breedlove, who collected the type specimen and who observed and reported the pendulous fruits, a character not necessarily displayed in dried specimens. The new species, which is illustrated in Fig. 3, is similar in many respects to Hampea longipes Miranda (cf. Fryxell, 1969) but differs in its relatively broader leaves (2.5 times as long as broad) that lack domatia, its single foliar nectary, and its larger, pendulous fruits that are wholly glabrous within rather than pubescent along the suture-margin and which have two or more seeds per locule rather than only one. The slender pedicels attain a length of as much as 11 cm in fruit, longer than is found in any other species in the genus.

4. Hampea montebellensis Fryxell, sp. nov.

Hampea laminis foliorum anguste ellipticis; caulis, petiolis, et pedicellis brunneo-puberulis persistentibus; parietibus interior

carpellorum dense albo-pubescentibus.

Tree 20 m tall in montane rain forest. Stems densely and persistently brown-puberulent. Leaf lamina entire, truncate to cuneate, ovate-elliptic, acute or acuminate, palmately 3-5 nerved, with domatia absent, reticulate-veined, up to 14 cm long, 2-3 times as long as broad, obscurely punctate, glabrate above, minutely puberulent below especially on nerves, without marginal cilia. Foliar nectaries 3, inconspicuous, 1 mm long, the central one on midrib 1/4 distance from leaf base or less, the lateral ones sub-basal. Petioles 1/4 length of lamina or less, densely puberulent. Stipules 6-10 mm long, filiform. Flowers unknown. Pedicels (in fruit) 1-3 in the axils, erect, 3-5 cm long, densely puberulent throughout. Involucral nectaries lacking (?); bractlets of the involucre 3, deciduous leaving scars. Calyx 5-6 mm long, irregularly torn and reflexed in fruit, minutely puberulent. Fruits 3-celled, stipitate, spherical, 1.5-2.0 cm long, green-puberulent externally, white-pubescent within. Seeds 1-2 per locule, reddish-brown to nearly black, glabrous, 8-10 mm long, arillate, the aril approximately equaling the seed.

Type: Mexico: Chiapas: Municipio of La Trinitaria, slopes with montane rain forest, Liquidambar, Magnolia, Vochysia, east of Laguna Tzikaw, Monte Bello National Park, elev. 1300 m, 23 Jan 1973, Breedlove & Smith 32191 (holotype: DS-655641).

Hampea montebellensis is allied to H. integerrima and H. longipes (cf. Fryxell, 1969). It shares with H. integerrima the dense pubescence on the inner wall of the carpels, a character unique to these two species; this pubescence is white in H. montebellensis and brown in H. integerrima. It resembles H. longipes in its relatively narrow, elliptic leaves and its relatively long pedicels. It is distinct from either of these two species in its densely and persistently brown-puberulent stems, petioles, and pedicels and is unique in its densely white-pubescent inner carpel walls. The specific epithet is taken from the type locality, the Lagos de Montebello in Chiapas immediately adjacent to the Guatemalan border. The holotype is illustrated in Fig. 4.

5. Kosteletzkya blanchardii Fryxell, sp. nov.

Kosteletzkya caulibus erectis, herbaceis, hispidis; laminis foliorum infernis valde hastatis, sursum gradatim deminutis atque anguste lanceolatis; inflorescentiis paniculatis; bracteis involu-cellis 4-6 mm longis, calycibus 6-8 mm longis, petalis 15-18 mm longis, roseolis macula flavida ad basim margine rubello; fructibus ca. 8 mm diametro.

Erect herbaceous perennial, the stems green, hispid with simple transparent hairs 1-2 mm long with a bulbous base, and with narrow longitudinal rows of minute recurved (or curled) hairs.

Leaf lamina markedly hastate below, palmately 5-7-nerved, up to 8 cm long, the central lobe triangular and more than twice as long as broad, serrate, acute, sparsely hirsute below with appressed simple hairs 1 mm long and a few 3-4-armed stellate hairs, the hairs similar but fewer on upper surface; upper leaves progressively reduced becoming narrowly lanceolate, without lobes, and 5-6 times as long as broad. Petioles up to 2.5 cm long, with pubescence like that of stem. Stipules filiform, 5 mm long, ciliate. Inflorescence a diffuse panicle. Flowers axillary, solitary or paired, sometimes one member of pair a multi-florate inflorescence. Pedicels up to 6 cm long (in fruit), slender, with pubescence like that of stem, articulated near apex. Involucel of 7-9 bracts at base of calyx; bracts linear, 4-6 mm long, hispid. Calyx 6-8 mm long, ca. 2/3-divided, sparsely hispid; lobes cordate-ovate, 3-veined, up to 4 mm broad (in fruit). Corolla rotate; petals 15-18 mm long, 12-15 mm broad, stellate-pubescent (3-armed hairs) externally in bud, glabrous within and on claw, pink with a yellow spot at base that is bordered by red. Staminal column glabrous, pallid, ca. 1 cm long, with anthers scattered along upper portion; filaments 1.0-1.5 mm long; anthers pale yellow, ca. 30; pollen yellowish, spherical, echinate. Styles 5, free, essentially glabrous, exceeding androecium by 2-3 mm; stigmas capitate, 0.5-0.8 mm diameter, reddish with whitish hairs on stigmatic surface. Capsule 5-celled, depressed, 5-winged, 3-4 mm high, ca. 8 mm diameter, minutely pubescent throughout and strigose on wings, transversely rugose. Seeds unknown. Chromosome number: $n = 19$ (Blanchard, 1974, as K. pentasperma).

Type: Mexico: Michoacán: S of Zitácuaro, between Benito Juárez and Tuzantla (ca. 13 mi N of Tuzantla); alt. 4200 ft; in wet ground by roadside; flowers pink with yellow center (bordered by red), 15 Oct 1970, Fryxell, Bates, & Blanchard 1650 (holotype: BH, isotype: pf). Paratype: Zitácuaro-Santa Anna, Hinton 13338 (US).

The specific epithet is chosen to honor O. J. Blanchard Jr., participant in the collection of the type material and determiner of the chromosome number of this and other species of Kosteletzkya (Blanchard, 1974).

A useful treatment of the American species of Kosteletzkya has not yet been written. The genus is very distinctive, especially in its fruit structure but also in other characters such as floral morphology, investiture, chromosome number, and a preference for wet soils. The Mexican species occur from near sea level to elevations of almost 2000 m and show a wide range of morphological diversity. Nevertheless, the present species and the two following are clearly distinct from others previously described.

Kosteletzkya blanchardii is distinctive for the combination of hastate leaves and a rotate corolla with large pink petals having a yellow spot at base with a red border. It is illustrated in Fig. 5.

6. Kosteletzkya ramosa Fryxell, sp. nov.

Kosteletzkya caulibus erectis, ramosis, dense stellato-tomentosis; laminis foliorum late cordatis; inflorescentiis paniculatis; bracteis involuicelli 3-5 mm longis; calycibus 4-7 mm longis, petalis 22-25 mm longis, roseolis; fructibus ca. 6 mm diametro.

Perennial to 2 m tall, much branched above; stems densely and persistently stellate-tomentose, with inconspicuous longitudinal lines of dense minute hairs. Leaf lamina broadly cordate-ovate with some indication of weakly developed lobing, up to 10-11 cm long, equally broad, basally cordate, crenate-serrate, acute, palmately 7-9(-11)-nerved, moderately stellate-pubescent above and below, the hairs principally 2-3-armed above, 4-6-armed below. Petioles up to 4 cm long, densely stellate-tomentose. Stipules caducous, not seen. Inflorescence a terminal branching panicle mostly above the leaves. Pedicels 2-6 mm long, minutely stellate-pubescent (hairs 0.1-0.3 mm) and sometimes with a few coarse hairs 1-2 mm long. Involuicel of ca. 10 bracts at base of calyx; bracts linear, 3-5 mm long, ciliate (hairs 1-2 mm long). Calyx 4-7 mm long, ca. 2/3-divided, minutely stellate-pubescent; lobes ovate-triangular, obscurely 3-nerved. Corolla rotate; petals pale pink (darker in bud), 22-25 mm long, pubescent externally in bud, glabrous within and on claw. Staminal column 18 mm long, slender, pallid, glabrous or with peg-like emergences toward base, apically 5-dentate; filaments 1-2 mm long, glabrous, emerging from column in 2-3 groups, the proximal group abortive and sterile; anthers few (ca. 25), secund, yellowish; pollen yellow, spherical, echinate. Styles exceeding androecium by 6-7 mm, free apically for 3-4 mm, slightly pubescent, reddish; stigmas 5, capitate, reddish, inconspicuously villous. Capsule 5-celled, depressed, 5-winged, 3-4 mm high, ca. 6 mm diameter, minutely stellate-pubescent and also prominently strigose throughout. Seeds unknown.

Type: Mexico: Jalisco: roadside ditch 1 mi E of Ayo el Chico, elev. ca. 1550 m, local; perennial to 2 m high, much branched above; flowers pale pink; 23 Aug 1958, McVaugh, Loveland & Pippen 17230 (holotype: MICH; isotypes: pf and to be distributed by MICH).

The specific epithet is chosen in reference to the collectors' description "much branched above." The species is distinctive for its broadly cordate leaves, its dense stellate pubescence on stems and petioles, its relatively small calyx and relatively large rotate corolla, and its paniculate inflorescence. An isotype of K. ramosa is illustrated in fig. 6.

7. Kosteletzkya reclinata Fryxell, sp. nov.

Kosteletzkya caulibus reclinatis, hispidis; laminis foliorum late cordatis; inflorescentiis racemosis; bracteis involuicelli 8-12 mm longis, calycibus 8-10 mm longis, petalis 25-30 mm longis,

roseolis; fructibus 10 mm diametro.

Reclining subshrub, the stems woody at the base, with two types of pubescence: long, simple bulb-based hairs 2-3(-4) mm long that are uniformly distributed, and minute, fine hairs ca. 0.5 mm long in narrow, dense, longitudinal rows. Leaf lamina broadly cordate-ovate, up to 8 cm long, more or less as broad as long, with an open basal sinus, coarsely dentate, acute to short-acuminate, palmately 7-9-nerved, moderately hirsute above and below (the margins ciliate) with hairs 1-2 mm long, the hairs usually simple but sometimes stellately 2-5-armed. Petioles 1-3 cm long, hispid with pubescence like that of stem. Stipules filiform, 10-15 mm long, prominently ciliate, the hairs 1-2 mm long, caducous. Inflorescence a leafless apical raceme 6-12 cm long, except that the lowermost flowers are subtended by leaves. Pedicels ca. 1 cm long in inflorescence (to 2.5 cm in foliage) with hispid pubescence like that of stem. Involucel of ca. 10 bracts immediately below the calyx; bracts filiform, prominently hispid-ciliate, spreading and arcuate in fruit, 8-12 mm long. Calyx 8-10 mm long (slightly accrescent in fruit), hirsute, ca. 2/3-divided, the lobes 3-veined, sometimes purplish. Corolla rotate; petals 2.5-3.0 cm long, externally pubescent in bud (with both coarse, stellate hairs and minute multicellular hairs), pink. Androecium 2 cm long, 1 mm diameter, pallid, with a few, minute, peg-like protruberances but otherwise glabrous, apically 5-dentate, antheriferous toward apex; filaments 1.0-1.5 mm long, more or less secundly arranged; anthers yellow, ca. 30; pollen yellow, spherical, echinate. Styles and stigmas exceeding androecium by 8 mm; styles 5, free apically for ca. 3 mm, minutely white-pubescent with multicellular hairs; stigmas 5, capitate, 0.5-1.0 mm diameter, reddish, densely villous. Capsules 5-celled, depressed, 6 mm long, 10 mm diameter, 5-winged, minutely stellate-pubescent throughout and with a few coarse, simple hairs, the carpel walls transversely ridged. Seeds unknown.

Type: Mexico: Jalisco: near Km 158, road from Zapotlanejo, ca. 7 mi WNW of Tototlan; adobe soil, poorly drained and periodically flooded meadow; elev. ca. 1800 m, abundant. Reclining, the stems 1 m long, woody at base; flowers clear pink; anthers yellow; stigmas reddish. 24 Aug 1958, McVaugh, Loveland, and Pippen 17259 (holotype: MICH: isotypes: pf and to be distributed by MICH).

The specific epithet of K. reclinata refers to the growth habit as given by the collectors. The species is distinctive for this growth habit and for its broadly cordate leaves, its racemose inflorescence, its hispid investiture of stems and petioles, its relatively large involucel, calyx, and fruit, and its large rotate corolla with pink petals. An isotype is illustrated in Fig. 7.

8. Pavonia biflora Fryxell, sp. nov.

Pavonia non viscida, fruticosa pedunculis axillaribus, floribus in umbellis binatis; bracteolis involucellorum 5, distinctis, late

lanceolatis (12-14 mm longis, 5-6 mm latis); corollis grandis, roseis faucibus sanguineis; mericarpiis glabris, rugulosis.

Viscid shrub to 2.5 m tall. Younger stems with both short (<1 mm) glandular hairs and long (2 mm) non-glandular hairs; only the glandular hairs persisting on older stems. Leaf lamina simple, ovate-cordate, serrate, acuminate, to 10.5 cm long, 7 cm wide, palmately 9-11-nerved, discolorous, sparsely pubescent above (with both stellate and simple hairs), densely white-stellate-pubescent below. Petioles up to 4 cm long, with pubescence like that of stem. Stipules filiform, 6-8 mm long, densely ciliate. Peduncles axillary, usually solitary, up to 10 cm long, with pubescence like that of stem, usually umbellately 2-flowered; pedicels articulated up to 1 cm long. Involucel of 5 distinct bracts; bracts broadly lanceolate, 12-14 mm long, 5-6 mm broad, broadest near middle, narrowed below to cuneate base, apically acute, densely pubescent within and without, long-ciliate only near base. Calyx 10-11 mm long, ca. half-divided, glabrous within, pubescent without, the lobes apically long-ciliate (hairs 2 mm) on entire margin. Corolla 4.5 cm long, sparsely and obscurely pubescent externally, glabrous on claw; petals pink with dark red spot at base. Androecium ca. 2.5 cm long, the stamens cream [fide Irwin et al. 26416], scattered throughout length of staminal column. Styles and stigmas 10, exceeding androecium. Mericarps 5, ca. 6 mm long, glabrous, rugulose.

Type: Brazil: Distrito Federal: Cachoeira Piripiripau, ca. 15 km S of Planaltina; gallery and adjacent cerrado, sandy soil, common in disturbed gallery, 20 Feb 1970, Irwin et al. 26416 (holotype: UB; isotypes: NY, pf).

Pavonia biflora has its closest affinity with Pavonia garckeanae Gürke, from which it differs in its paired (rather than solitary) flowers, its 5 lanceolate (rather than 4 cordate) bracts of the involucel, a different pubescence pattern, and possibly a greater stature and larger leaves. The specific epithet of this species, which is illustrated in Fig. 8, is chosen in reference to its distinctively paired flowers.

9. Pavonia macdougallii Fryxell, sp. nov. sectionis Lebretoniae.

Pavonia caulis petiolis pedicellisque dense hirsutis, pilis patentibus et non-viscidis; bracteolis involucellorum 5, distinctis, lanceolatis; margine calycis dense ciliatis; corollis grandis albisque.

Shrub 1.0-1.5 m tall. Stems densely covered with patent simple hairs 2(-3) mm long and with shorter stellate hairs. Leaf lamina up to 12 cm long, 8 cm broad, cordate-ovate, shallowly crenate to subentire, acute to acuminate, discolorous, green and sparsely pubescent above, densely white-stellate-pubescent below,

palately 7-9(-11)-nerved, the nerves pallid and raised above and below. Petioles up to 6 cm long, with the long simple hairs somewhat sparser than those on stem. Stipules 4-8 mm long, 1 mm broad at base, narrowly triangular, ciliate. Pedicels axillary, solitary, up to 5 cm long (in flower), exceeding the subtending petiole, with long simple hairs somewhat denser and slightly longer than those of the stem. Bracts of the involucl 5, distinct, lanceolate, 1-nerved, 15-20 mm long, 2.5-4 mm broad, broadest near the middle, acute, minutely wooly without, with simple hairs 1-2 mm long within and on margin. Calyx 8-10 mm long, half-divided, the lobes whitish, prominently 5-veined, densely ciliate, the hairs 3 mm long. Corolla white, 3.0-3.5 cm long, stellate-pubescent externally. Fruits schizocarpic, 8-9 mm diameter; mericarps 5, indehiscent, brownish, 5 mm high, minutely pubescent, prominently keeled dorsally and ventrally, reticulate elsewhere, the reticulations expanded to produce 3 or 4 excrescences on each side of mericarp. Seed [immature] solitary, brownish, with weak hairs sparsely scattered over surface.

Type: Mexico: Oaxaca: [Distrito de] Tehuantepec: Tapesco, south of Tres Cruces, 3000 ft elevation, shrub with white flowers, in sun, 1 Nov 1971, MacDougall H 54 (holotype: NY, isotype: pf). Paratypes: [Distrito de] Tehuantepec: Cerro San Pedro, ca. 600 m elev., 8 Oct 1969, MacDougall 498.S (ENCB); Cerro Guiengola, 8 Dec 1970, MacDougall 617.S (ENCB).

Tres Cruces is due north of the city of Tehuantepec at 16°40'N, 95°16'W; the type locality Tapesco, thus, is near the summit of Cerro Laollaga (elev. 1243 m). Tapesco does not appear on maps available to me, nor is it listed in the otherwise useful gazeteer of collecting localities of MacDougall published earlier by Goodwin (1969).

The specific epithet is chosen to honor the late Thomas MacDougall, collector of the type specimen and assiduous collector of both plants and animals of Oaxaca (Stix, 1975).

Pavonia macdougallii, which is illustrated in Fig. 9, is closely allied to the recently described P. fryxellii Krapovickas, from which it differs in its broader bracts of the involucl; its long, simple, non-glandular hairs of the stem, petioles, pedicel, involucl, and calyx; and its somewhat smaller corolla. P. fryxellii is notably viscid, whereas P. macdougallii is evidently not. P. macdougallii occurs to the southeast of the range of P. fryxellii.

10. Pavonia submutica Fryxell, sp. nov.

Pavonia stellato-pubescentes fruticosa; laminis foliorum late ovatis; bracteolis involuclorum ca. 15, arcuatis, filiformibus, 20-25(-30) mm longis, copiose ciliatis (pilis 1-3 mm longis); calycibus 10-18 mm longis; mericarpis laevis, acumine apicale

atque 2 acuminibus lateralibus.

Shrub up to 2 m tall. Stems evenly stellate-pubescent, the hairs <1 mm long, persistent. Leaf lamina ovate-triangular, truncate or slightly cordate, finely serrate, acute, up to 9.5 cm long, 6 cm broad, palmately 7-9-nerved, somewhat discolorous, stellate-pubescent above and below. Petioles up to 3 cm long, densely stellate-pubescent. Stipules 8-12 mm long, linear, pubescent, caducous. Flowers more or less apically congested in few-flowered corymbiform inflorescences. Pedicels solitary in the axils, 1-4 cm long, pubescent. Bractlets of the involucre ca. 15, arcuate, filiform, 20-25 (-30) mm long, copiously ciliate, the hairs 1-3 mm long. Calyx 10-18 mm long, pubescent, more than half-divided; lobes acute, 3-veined. Petals yellow, ca. 2 cm long. Staminal column 15 mm long, 1 mm diameter, pallid, glabrous; filaments 3-5 mm long, glabrous, arising throughout length of column; anthers and pollen yellow. Styles and stigmas 10, glabrous, slightly exceeding uppermost anthers. Mericarps 5, smooth, straw-colored, reticulate-veined, the dorsal nerve prominent, with one apical and two lateral points (these much reduced compared to the cusps usual in section Typhalea), sometimes the points having a very few retrorse barbs, or barbs absent.

Type: Mexico: Chiapas: 11 miles east of Tapanatepec on the Chiapas-Oaxaca state line along highway 190, steep heavily wooded slope, elev. 2300 ft; flowers yellow, plant 6 ft tall, 20 Oct 1965, Breedlove & Raven 13715 (holotype: CAS; isotype: pf). Paratypes: Oaxaca: Carretera de Tuxtla Gutierrez a Juchitán, 19-21 km noreste de Tapanatepec, alt. 630 m, 2 Dec 1973, Banda, Maldonado & Koch 73154 (CHAPA, ENCB, pf); 1/2 mi W of Chiapas state line on hwy 190, 1800 ft alt., 23 Jan 1969, Fryxell & Bates 902 (BH, pf); foot of Cerro de la Gineta, 20 km [N of] Tapanatepec, Smith & Ruiz 3237 (US).

Pavonia submutica, which is illustrated in Fig. 10 and Fig. 13, C, is known from a limited area near the northwestern extremity of the Sierra Madre de Chiapas at the Oaxaca-Chiapas boundary. The specific epithet is chosen in reference to the reduced nature of the cusps on the mericarps, which in section Typhalea are usually longer (often very long) and retrorsely barbed. In the new species the cusps are reduced to mere points and the barbs are almost obsolete.

The nearest ally of Pavonia submutica is P. arachnoidea Presl. Distinctive differences between these two species and the following new species, P. monticola, are presented in Table 3 and in Fig. 13, C-E. It is notable that, although these two species differ markedly in size of most floral parts, they have corollas of essentially identical size. The distribution of P. arachnoidea is relatively more northerly (Guerrero to Sinaloa) than that of P. submutica. These observations are based on the examination of, among other specimens, type material of P. arachnoidea (Haenke s.n., PR!).

Table 3. Comparison of three species of Pavonia.

	<u>P. arachinoidea</u>	<u>P. submutica</u>	<u>P. monticola</u>
Leaf size (maximum)	6.0 cm long, 4.0 cm broad	9.5 cm long, 6 cm broad	11 cm long, 5.5 cm broad
Flowers	scattered along stem	congested apically	somewhat congested apically
Pedicels	2-3 (or more) times length of involucl	commonly shorter than involucl	4-5 times length of involucl
No. of bracts in involucl	12-15	15	8
Involucl length	10-15 mm	20-25 mm	10-15 mm
Indumentum of involucl	ciliate	ciliate	viscid
Calyx length	5 mm	10-18 mm	7-8 mm
Petal length	18-22 mm	18-22 mm	12 mm
Staminal column length	5 mm	15 mm	12 mm
Filament length	1-2 mm	3-5 mm	1-3 mm

Pavonia submutica is further compared with P. monticola under the discussion of the latter species.

Bates (1976) has reported a chromosome count of $n = 21$ for Pavonia arachnoidea, but no count is yet known for P. submutica.

11. Pavonia monticola Fryxell, sp. nov.

Pavonia fruticosa viscida, laminis foliorum anguste ovatis acuminatis, pedunculis in axillis solitariis vel binatis, plerumque petiolos subtendentes excedentibus, bracteolis involucellorum octo linearibus patentibus calycem excedentibus, calycibus ciliatis nervis marginibusque atrovirentibus, corollis flavis, mericarpiis cusptide subapicali (0.3 mm) glochidiis retrorsis.

Shrub to 2 m tall. Stems erect, densely pubescent with both stellate and simple, glandular hairs 0.5 mm long. Leaf lamina narrowly ovate, up to 11 cm long, about twice as long as broad, discolorous, cordate, doubly serrate, acuminate, palmately 9-11-nerved, stellate-pubescent above and beneath, with denser coarser pubescence beneath and with intermixture of glandular hairs above. Petioles approximately equaling leaf width, with pubescence like that of stem with addition of a few long simple hairs (1-2 mm) especially at distal end. Stipules 4-12 mm long, narrowly linear, glandular-pubescent, relatively persistent. Peduncles axillary, solitary or more commonly paired, up to 5.5 cm long, equaling or (usually) exceeding subtending petiole, with pubescence like stem, articulated above the middle, the pedicel (in fruit) 7-13 mm long. Involucl of 8 bractlets; bractlets spreading, linear, viscid, 10-15 mm long, 1 mm broad. Calyx 7-8 mm long, ca. 1/2-divided into 5 lobes; the lobes ciliate (hairs 1.0-1.5 mm long), 3-nerved, the nerves and margins dark green, the intercostal areas whitish. Petals yellow throughout, ca. 12 mm long, stellate-pubescent externally, glabrous within, densely ciliate on claw. Staminal column glabrous, almost equaling petals, surmounted by 5 narrow teeth, antheriferous throughout length, the anthers tending to be "stratified" at 3 or 4 levels; filaments 1-3 mm long, the lowermost the longest; pollen yellow, spherical, echinate. Styles 10, glabrous, slightly exserted; stigmas capitate, villous, ca. 0.2 mm diameter. Fruit a schizocarp of 5 mericarps, obovate or somewhat obovate; mericarps 5 mm long, trigonal in cross-section, the walls smooth or with poorly developed reticulation, the juncture of the dorsal and lateral walls winged (the wing 0.1-0.2 mm wide) with a small (0.3 mm) triangular cusp subapically on median nerve of dorsal wall bearing a few retrorse barbs, with a few additional retrorse barbs on lateral margin (wing); mericarps otherwise glabrous; seed solitary, 4 mm long, brownish, glabrous.

Type: Mexico: Chiapas: steep heavily wooded slope along Mexican highway 190, 11 miles NE of Tapanatepec on the line between Chiapas and Oaxaca; elev. 2300 ft, flowers yellow; shrub 6 ft tall, 20 Oct 1965, Breedlove & Raven 13716 (holotype: CAS; isotype: pf).

Chiapas: Municipio de Cintalapa, near the microwave station of La Mina, 12 km S of Mexican highway 190 near Rizo de Oro; elev. 1000 m; crest of the Sierra with Pinus and Quercus and riparian situations with Seasonal Evergreen Forest, 16 Oct 1971, Breedlove & Thorne 20685 (paratype: DS).

Both Pavonia monticola and P. submutica are described from the same type locality. Their general aspect and their mericarp morphology are quite dissimilar (cf. Table 3 and Fig. 13) and they are not to be confused. The involucl of P. monticola is 8-parted, spreading, and viscid; that of P. submutica is ca. 15-parted, arcuate, ciliate, and about twice as long as that of P. monticola. The peduncles are many times longer than the involucl in P. monticola, subequal to it in P. submutica. The leaves are narrower and the petioles longer in P. monticola than in P. submutica. Both species are known from two or more collections each, and there is no suggestion of intergradation.

P. monticola, an isotype of which is illustrated in Fig. 11, bears a superficial resemblance to P. paniculata, particularly if the nature of the inflorescence is not well represented in the specimen at hand. However, a closer examination can easily distinguish them, especially an examination of the mature fruits (Fig. 13, E-F), which in P. paniculata are reticulate but otherwise unornamented and which in P. monticola bear a retrorsely barbed subapical cusp and a lateral wing. P. monticola is evidently closely allied to the poorly known species P. hirtiflora Bentham, in which the flowers are always solitary rather than usually paired in P. monticola.

12. Sida andersonii Fryxell, sp. nov.

Sida dense stellato-pubescentes, pilis sessilibus atque stipitatis immixtis; laminis foliorum late rhombiformibus, obtusis, discoloribus; pedicellis brevibus, apice aggregatis in inflorescentia ramosis corymbiformibus; corollis flavidis faucibus rubris; mericarpis 8, fuscis, apice dense pubescentibus.

Branching shrub to 1 m tall. Stems densely stellate-pubescent with both sessile and stalked hairs. Leaf lamina broadly rhomboid, up to 4 cm long, 2.5 cm broad, smaller and narrower above in the inflorescence, discolorous, minutely soft-pubescent above and below, whitish below, truncate or subcordate at base, entire proximally, serrate distally, obtuse, palmately 3(-5)-nerved. Petioles up to 8 mm long, with pubescence like that of stem. Stipules linear, pubescent, 5-7 mm long. Flowers aggregated terminally in branched corymbiform inflorescences. Pedicels solitary in the axils or sometimes paired, 3-10 mm long, stellate-pubescent. Calyces 5-7 mm long, densely stellate-pubescent without, essentially glabrous within, broadly rounded and 10-nerved at base. Petals 6-7 mm long, glabrous, pale yellow with red base. Staminal column 1.5 mm long, pallid, glabrous; filaments emerging at apex of column, pallid, 1.5

mm long; anthers and pollen yellow. Styles and stigmas 8, reddish, glabrous, about equaling the filaments. Fruit oblate, 5 mm diameter, of 8 mericarps, densely pubescent apically; mature mericarps 2.5-3.0 mm tall, blackish, lightly reticulate laterally, white- or yellow-pubescent on apical portion of dorsal wall (otherwise glabrous), with 2 minute (up to 1 mm) spines at apex, broadly trigonal in cross-section. Seed solitary, pubescent on hilum, otherwise glabrous and smooth.

Type: Brazil: Minas Gerais: Serra do Espinhaco, 25 km by road NE of Diamantina, 2 km W of Rio Jequití; elev. 790 m; dense cerrado on rocky (quartzite) hillside and woods along stream; soil sandy; shrub to 1 m tall; corolla cream with red center, 9 Apr 1973, Anderson et al. 8348 (holotype: UB; isotypes: NY, pf). Paratypes: Brazil: Goiás: 35 km by road E of Cristalina; elev. 990 m; cerrado; shrub 75 cm tall; corolla yellow with red center, 6 Apr 1973, Anderson et al. 8293 (NY, UB, pf).

The specific epithet is chosen to honor William R. Anderson, leader of the expedition on which the type material was collected and able student of the Malpighiaceae.

Sida andersonii fails to key out satisfactorily in Kearney (1958) or other available keys to South American Sida. It shows a superficial resemblance to the Brazilian S. galheirensis Ulbrich, but shows a stronger resemblance to the African Sida ovata Forssk. It is evidently allied to that group of species characterized by rhomboid leaves, including the well-known pantropical weed S. rhombifolia Linnaeus. S. andersonii stands apart in its densely pubescent herbage, its relatively broad rhombic leaves, and its distinctively pubescent fruits. It is illustrated in Fig. 12.

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NOTE ADDED:

The publication of Hampea bracteolata Lundell (Wrightia 5:357. 1977) has just come to my attention. Hampea montebellensis and H. bracteolata are similar in many respects, but differ in enough characters to be considered distinct species. H. montebellensis lacks domatia, has a calyx 5-6 mm long, lacks involucellar nectaries, has a deciduous involucl, and one to two seeds per locule. H. bracteolata, on the other hand, has conspicuous domatia, a calyx up to 8 mm long, large involucellar nectaries, a persistent involucl, and only one seed per locule.



Figure 1. Isotype of Abutilon pinkavae.



Figure 2. Holotype of Dendrosida breedlovei.



Figure 4. Holotype of Hampea montebellensis.



Figure 5. Isotype of Kosteletzkya blanchardii.



Figure 6. Isotype of Kosteletzkya ramosa.



Figure 7. Isotype of Kosteletzkya reclinata.



Figure 8. Isotype of Pavonia biflora.



Pavonia macdougallii Fryxell, sp. nov.

ISOTYPE

Determin. P. Fryxell

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HERBARIUM OF
THE NEW YORK BOTANICAL GARDEN
PLANTS OF THE GARDEN

Common with white flowers, 1000 ft.
elevation, south of San Juanes, 3000' elev.
Chiriqui, Panama.

Collected by P. Fryxell

November, 1971

Figure 9. Isotype of Pavonia macdougallii.



PLANTS OF CHIAPAS, MEXICO

2200' - yellow, blue, white, pink
 steep heavily wooded slope along Rio
 highway 100 m. N. of Las Vigas west of General
 San Juan, Chiapas, Mexico
 Fryxell, 1975

Determin. P. Fryxell

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COMBUSTION
SAVINGS

Figure 10. Isotype of Pavonia submutica.



Figure 11. Isotype of Pavonia monticola.



Sida andersonii Fryxell, sp. nov.

ISOTYPE

Determ. P. Fryxell

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PLANTS OF THE PLANALTO DO BRASÍL
Collected for The New York Botanical Garden by W. R. Anderson,
P. A. Fryxell, E. R. Hill, R. Fato das Neves, and R. Sousa

Estado de Minas Gerais
Serra de Espinhaço

sida

70 km by road to ... quartzite hills and woods along stream; sandy. Shrub 1 m tall, ... center

William R. Anderson April 1973

Plant work supported in part by ... and analyzed with the ...

Figure 12. Isotype of *Sida andersonii*.

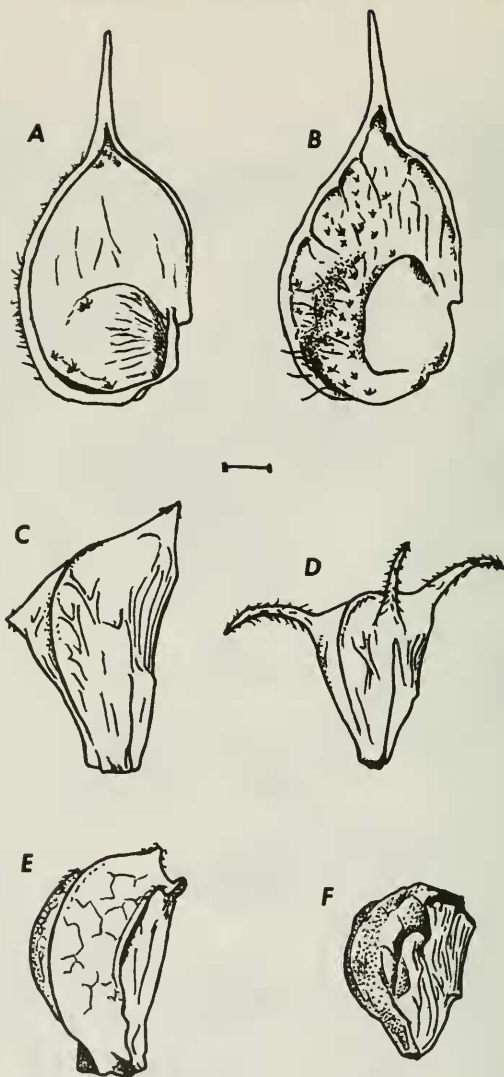


Figure 13. Mericarps of selected species. A-B, Abutilon pinkavae (Pinkava & Reeves 13044); A, interior of mericarp; B, exterior of mericarp. C, Pavonia submutica (Fryxell & Bates 902); D, Pavonia arachnoidea (Palmer 153); E, Pavonia monticola (Breedlove & Raven 13716). Pavonia paniculata (Dwyer & Liesner 12308). Scale = 1 mm.